



Stream Length Impaired by Metals other than Mercury

This EnviroAtlas national map displays the length in kilometers of streams, coasts, canals, and other linear hydrographic features from the 303(d) list of impaired waters within each 12-digit hydrological unit (HUC) that are impaired by metals other than mercury.

Why are impaired streams important?

Stream impairments can be due to a wide variety of causes, including chemical pollutants, physical conditions such as siltation, or biological contaminants such as bacteria. This map shows waters that are impaired by heavy metals other than mercury. For a map and fact sheet covering mercury pollution in streams, see [Stream Length Impaired by Mercury](#).

Metals impairments can have serious impacts on ecosystems, human health, and the economy. Metals enter waterways from factories, mining, and stormwater runoff. They can also enter water through natural processes, such as volcanic eruptions or the erosion of soils and rocks containing heavy metals. Metals may be toxic to humans and animals, and they are expensive to remove from drinking water sources.

Urban stormwater runoff can carry heavy metals from city and suburban pavements to soil and nearby waterbodies. Auto tire and brake wear are sources of zinc, cadmium, copper, lead, chromium, and manganese. Engine wear and fluid leakage also produce aluminum, copper, nickel, and chromium.¹ Heavy metal pollution in streams may be found in more remote areas from industrial uses or mining. Heavy metal concentrations in streams draining mined areas negatively affect the productivity of aquatic and semi-aquatic biota. A study conducted in the Colorado Rocky Mountains found that mayflies, an important food source in mountain streams, were reduced by 75% in streams that were moderately polluted by heavy metals such as aluminum, cadmium, copper, lead, and zinc from mining.²

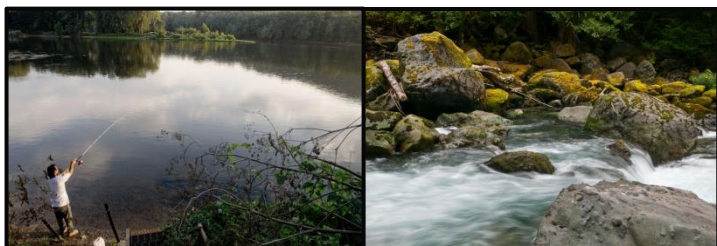


Photo: Eric Vance/USEPA

Section 303(d) of the Clean Water Act requires states to identify water bodies that do not support state designated clean water uses, such as fishing, irrigation, industrial uses, or drinking water supply, due to pollution or other impairments. The states must then establish [Total Maximum Daily Loads](#) (TMDLs), which cap the amount of each pollutant allowed in the water body based on its use. The TMDL sets a target for the total load that the water body is expected to assimilate and then divides the load into allowable contributions from [point](#) and [nonpoint](#) sources.

How can I use this information?

The map, Stream Length Impaired by Metals other than Mercury, provides information about the length of streams and other waters with impairments in a 12-digit HUC. It can be used to identify HUCs that have impairments caused by metals. Information about the extent and causes of impairments could guide projects for improving water quality or inform decisions about how best to use water resources.

Users can view this information along with other EnviroAtlas map layers, such as impervious surface and riparian buffers, to identify possible sources of impairments and remediation needs. The map can also be combined with layers on recreation or domestic water consumption to show how metal-related impairments relate to water use. This map can be viewed in conjunction with the stream length layer to find what percent of stream length in a watershed is impaired by metals other than mercury. Because the total length of streams in a HUC can vary, supplementing information on

impairments with information on stream length can give a clearer picture of the extent of impairments.

How was the data for this map created?

The January 2, 2013 [303\(d\) Listed Impaired Waters NHD Indexed Dataset](#) was used to create this map layer. This dataset includes a table listing impaired streams, rivers, and other linear features such as canals, pipelines, and coastlines. The impairment causes were then summarized into broad categories. For metals, two causes were included: Mercury and Metals other than Mercury.

Because some streams cross 12-digit HUC boundaries, the features were split where they crossed the boundaries. The lengths of all waters impaired by metals other than mercury were summed for each 12-digit HUC. For detailed information on the processes through which this data was generated, see the metadata.

What are the limitations of these data?

All national data layers, such as the 303(d) Listed Impaired Waters National Hydrography Dataset (NHD) Indexed Dataset, are by their nature inherently imperfect; they are an estimation of the truth based on the best available science. Calculations based on these data are therefore also estimations. The user needs to be aware that the mapped data should be used to inform further investigation. Periodic updates to EnviroAtlas will reflect improvements to nationally available data.

This layer only represents waters on a state's approved 303(d) list, rather than all impaired water bodies. Therefore, some impaired water bodies are not included in this layer. The extent of monitoring and the methods used also vary from state to state. The dataset may include false positives

resulting from data that is incorrect or inadequate for determining the exact location, or false negatives resulting from missing information. Because the total lengths of streams in a 12-digit HUC may vary, this information should be considered in conjunction with data on stream density and total lengths of streams and coastlines to better understand the extent of impairment in a 12-digit HUC. Accuracy information for the source data sets can be found on their respective web sites.

How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded. The dataset used to calculate the impairment counts, which provides greater detail on specific water bodies and the causes and sources of impairment, can be found on EPA's [WATERS Geospatial Data Downloads](#) website.

Where can I get more information?

There are numerous resources on water quality and impairment; a selection of these resources is listed below. The EPA Office of Water provides information on [Section 303\(d\)](#) of the Clean Water Act. For additional information on how the data were created, access the metadata for the data layer from the drop down menu on the interactive map table of contents and click again on metadata at the bottom of the metadata summary page for more details. To ask specific questions about this data layer, please contact the [EnviroAtlas Team](#).

Acknowledgments

The data for this map were generated by Megan Culler, EPA Student Services Contractor. This fact sheet was created by Megan Culler, EPA Student Services Contractor.

Selected Publications

1. Sansalone, J.J., S.G. Buchberger, and S.R. Al-Abed. 1996. [Fractionation of heavy metals in pavement runoff](#). *The Science of the Total Environment* 189/190: 371–378.
2. Clements, W.H., D.M. Carlisle, J.M. Lazorchak, and P.C. Johnson. 2000. [Heavy metals structure benthic communities in Colorado mountain streams](#). *Ecological Applications* 10(2): 626–638.
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- United States Environmental Protection Agency. 2016. [Healthy watersheds: Protecting aquatic ecosystems through landscape approaches](#). United States Environmental Protection Agency, Office of Water. Accessed May 2016.